Patent claims

1. A grating optical sensor comprising a lens (1) imaging an object space, a diffractive hexagonal 3D grating optical modulator (4) in the image plane (5) of the lens (1), a photoelectric receiver arrangement (8) arranged in the near field downstream of the modulator (4) in accordance with the centrosymmetrically trichromatic diffraction orders (R, G, B), and an evaluation device for the electric signals generated by the individual receivers (8), characterized in that at least one light-diffusion glass (9) is arranged in the pupillary plane of the lens (1) or in a pupillary plane conjugate thereto.

2. The grating optical sensor as claimed in claim 1, characterized in that the light-diffusion glass (9) has a grating structure.

3. The grating optical sensor as claimed in claim 1, characterized in that the diffusion characteristic of the glass (9) is selected so as to produce an image of the object space with uniformly superimposed background radiation from the object space.

4. The grating optical sensor as claimed in one of claims 1 to 3, characterized in that the spectral transmission of the lens (1), the diffusion glass (9)

and the modulator (4) is limited to the visible region of electromagnetic radiation.

5. The grating optical sensor as claimed in claim 4, characterized in that the spectral transmission is limited to the wavelength region of 380-780 nm.

6. The grating optical sensor as claimed in one of the preceding claims, characterized in that the receivers (8) are set to an identical spectral sensitivity for a radiation source (3) emitting white light.

7. The grating optical sensor as claimed in one of the preceding claims, characterized in that the receivers (8) assigned to the same chromatic diffraction order (R, G, B) in the trichromatic diffraction pattern (6) are interconnected to form a local chromatically additive brightness value (10, 10').

8. The grating optical sensor as claimed in one of the preceding claims, characterized in that the evaluation device includes a comparison arrangement (12) for determining the trichromatic diffraction pattern (6) with best agreement between the local chromatically additive brightness values (10, [lacuna]0').

9. The grating optical sensor as claimed in one of the preceding claims, characterized in that the

receivers (8) assigned to a trichromatic diffraction pattern (6) are interconnected to form a local trichromatically additive brightness value (11, 11').

10. The grating optical sensor as claimed in claims 8 and 9, characterized in that the evaluation device includes a white standard forming unit (13) whose output signal is respectively assigned to the local diffraction pattern (6) with best agreement between the chromatically additive brightness values (10, 10') and a simultaneously maximum trichromatically additive brightness value (11, 11').

11. The grating optical sensor as claimed in claim 10, characterized in that an adapter (16) is provided for varying the 3D grating constant of the modulator (4) as a function of a variation in the agreement between the chromatically additive brightness values (10, 10') of the diffraction pattern (6) forming the white standard signal.

12. The grating optical sensor as claimed in claim 11, characterized in that the adapter (16) includes a thermal radiation source (17) directed toward the modulator (4).

13. The grating optical sensor as claimed in claim 12, characterized in that the adapter (16) is assigned a controller which keeps the radiation intensity of the thermal radiation source (17) constant during determination of a new white standard signal.

14. The grating optical sensor as claimed in one of the preceding claims, characterized in that the evaluation device includes a color value forming unit (14) whose output signal respectively corresponds to the sum of the local chromatically additive brightness values (10, 10'), referred to the white standard signal, of a diffraction pattern (6).

15. A method for generating a white standard signal, comprising a grating optical sensor which has a lens imaging an object space, a diffractive hexagonal 3D grating optical modulator in the image plane of the lens, a photoelectric receiver arrangement arranged in the near field downstream of the modulator in accordance with the centrosymmetrically trichromatic diffraction orders, and an evaluation device for the electric signals generated by the individual receivers, characterized in that an incoherent background radiation assigned to the object space is superimposed by diffuse scattering in the pupil of the imaging lens or in a plane conjugate thereto in the image plane, and the white standard signal is formed from the diffraction pattern, assigned to a colorless part of the object space, with identical chromatically additive brightness values and a maximum trichromatically additive brightness value.

16. The method as claimed in claim 15, characterized in that when varying the illumination of

the object space, the grating constants of the modulator are varied by thermal influence until a new white standard signal is produced in the trichromatic diffraction pattern of a colorless part of the object space.

17. The method as claimed in either of claims 15 or 16, characterized in that the sum of the chromatically additive brightness values referred to a white standard signal is formed in order to generate a color value signal from the diffraction pattern assigned to a colored part of the object space.